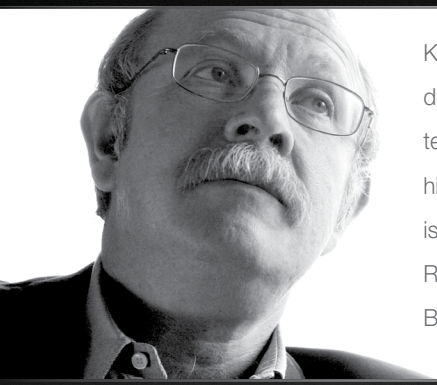
Rev 0 – Feb 2015



Key Digital®, led by digital video pioneer Mike Tsinberg, develops and manufactures high quality, cutting-edge technology solutions for virtually all applications where high quality video imaging is important. Key Digital® is at the forefront of the video industry for Home Theater Retailers, Custom Installers, System Integrators, Broadcasters, Manufacturers, and Consumers.

Key digital®

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Ultra HD/4K

CHAMPION SERIES™

KD-4x4CSK / KD-8x8CSK

4/8 Inputs to 4/8 Outputs HDMI Matrix Switchers, Audio De-embedders of Coaxial Digital & Analog L/R, support Ultra HD/4K

Operating Instructions

KD-4x4CSK

KD-8x8CSK

Key digital®

The Experts in Digital Video Technology and Solutions™

HDMI® HIGH-DEFINITION MULTIMEDIA INTERFACE

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3D Ultra HD/4K

LIMITED LIFETIME WARRANTY

Always follow the instructions provided in this Operating Manual.

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Introduction

Key Digital® Champion Series™ KD-4x4CSK/KD-8x8CSK are HDMI Matrix switchers capable of switching 4/8 independent Inputs/Sources to 4/8 independent Outputs/Zones and feature de-embedding of HDMI audio for external distribution.

Key Features

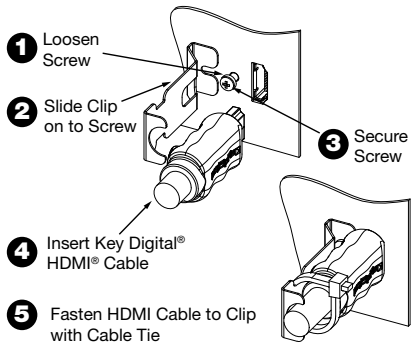
- **HDMI Matrix Switching:** 4/8 HDMI sources to 4/8 HDMI outputs
- **Resolution Support:** Supports all SD, HD, and VESA (VGA, SVGA, XGA, WXGA, SXGA, UXGA) resolutions up to UHD/4K (4Kx2K/60[4:2:0], 4Kx2K/30/25/24[4:4:4])
- **Ultra HD/4K:** 4K/2K video resolution support for 4K-capable televisions and commercial applications such as Digital Movie Theaters, CAD, Post Production
- **Audio De-Embedder:** Audio from the selected HDMI input may be de-embedded through the Coax digital (PCM) or Analog L/R audio output
- **3D Ready:** Capability to pass 3D stereoscopic signal formats
- **Full Buffer System™:** Manages TMDS re-clocking / signal re-generation, HDCP authentication to source & display, and EDID Control handshake
- **EDID:** Internal library with 15 default EDID configurations for input, in addition to native EDID data for any Output/Display
- **TMDS re-clocking:** Support for long HDMI connectivity using Key Digital® HDMI cables
- **Lossless Compressed Digital Audio:** Dolby® TrueHD, Dolby® Digital Plus and DTS-HD Master Audio™
- **Deep Color Support:** Up to 12 bits/color
- **Licensing:** Fully licensed and compatible with all HDMI and HDCP technologies
- **Control:** Front panel buttons/LEDs, Serial IR, Optical IR, and RS-232 Control, including discrete power on and off via IR and RS-232
- **Major Control System Support:** Compass Control®, AMX®, Control4®, Crestron®, Extron, Leviton®, RTI®, Savant, URC®, etc.

Accessories

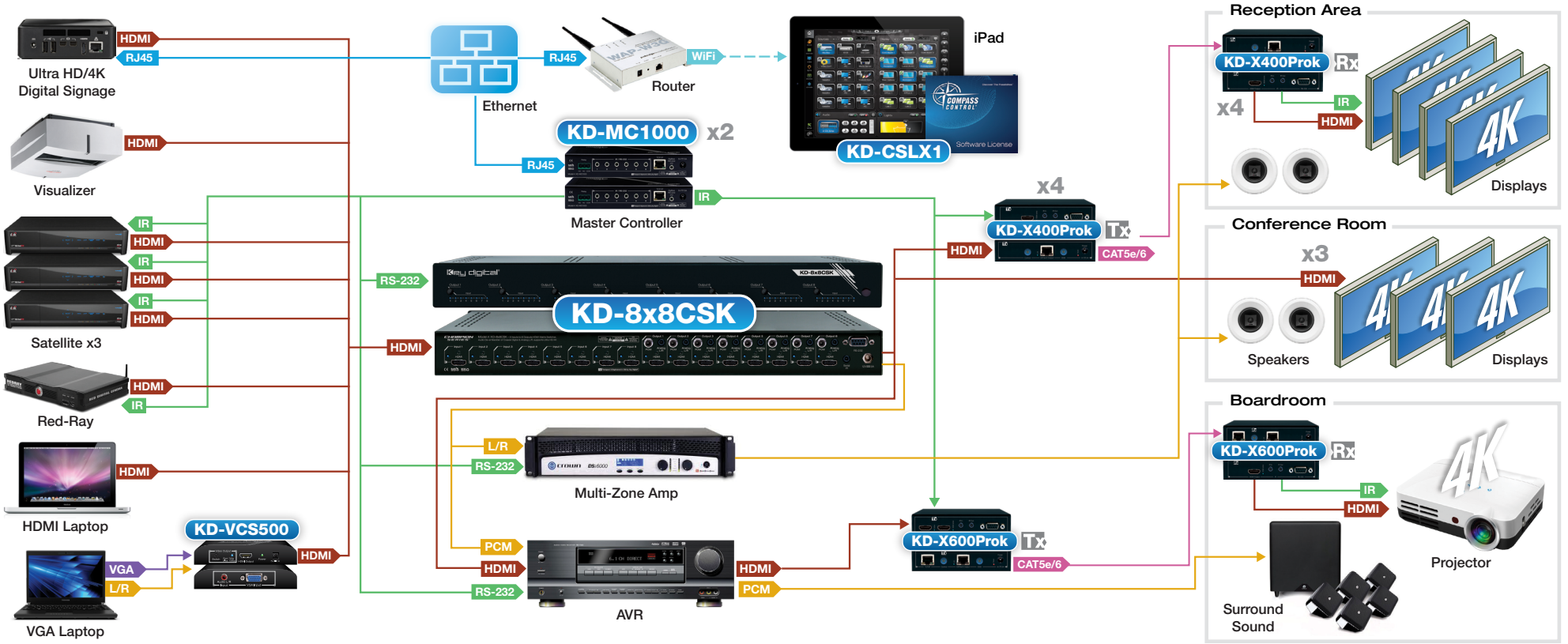
- Power Supply: (KD-4x4CSK) KD-PS12V2A 12V/2A DC Power Jack, Srew In Type, (KD-8x8CSK) KD-PS12V5A 12V/5A DC Power Jack (2.1mm), Screw In Type
- Remote Control
- (8/16) HDMI Lacing Clips
- Rack Ears
- Operating Instructions
- Warranty Card

Rack Mounting

Secure the rack ears to each side of the KD-4x4CSK/KD-8x8CSK with the supplied hardware then fasten the unit to the rack rails with the included machine screws.


1 Loosen Screw
2 Slide Clip on to Screw
3 Secure Screw
4 Insert Key Digital® HDMI® Cable
5 Fasten HDMI Cable to Clip with Cable Tie

Application Example



Quick Setup Guide

1. Begin with the KD-4x4CSK/KD-8x8CSK and all input/output devices turned off with power cables removed.
2. Connect HDMI sources to the appropriate input ports on the KD-8x8CSK.
3. Connect display devices to the HDMI output ports and audio devices to audio output ports.
4. Connect power to the KD-4x4CSK/KD-8x8CSK as well as to all other input and output devices and turn them on.
5. Operate the KD-4x4CSK/KD-8x8CSK switcher via front panel buttons, Serial IR, Optical IR, and RS-232 control.

Operation

After performing the setup above, the unit is ready for operation. There are several options for controlling the unit. Commands can be issued via Serial IR, Optical IR, and RS-232, or by using the front panel buttons.

› Note: Many advanced commands for setup and/or operation are available only via RS-232.

IR Emitter Control

When using an IR Emitter / IR Extender (sold separately), the IR Emitter must be mounted over the IR Sensor on the front of the KD-4x4CSK/KD-8x8CSK. One end of the cable is connected to the IR Receiver / Master Controller / IR Extender / IR Connecting Block, while the other end is mounted over the IR Sensor of the KD-4x4CSK/KD-8x8CSK.

Serial IR Operation

The unit may also be controlled via the Serial IR interface, providing a hard-wired IR connectivity. Use a 3.5mm Male Mono plug with the IR signal carried on the tip of the connector.

Connections, Buttons & LEDs

Rear Panel Connections

All connections to the KD-4x4CSK/KD-8x8CSK are found on the rear panel of the units. Refer to the illustrations below for port assignments while making connections.

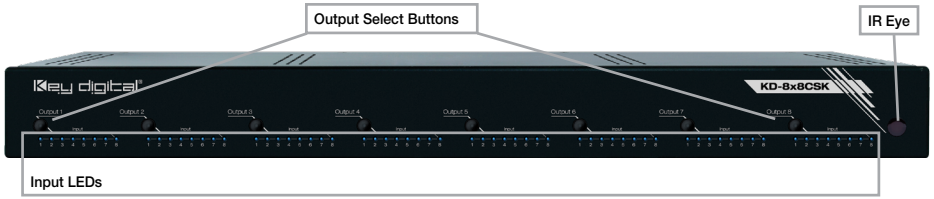
- **HDMI Inputs:** The HDMI Inputs are located on the left side of the back panel. The Inputs have a blue LED that will illuminate solid during active link (voltage + data link)
- **HDMI Outputs:** The HDMI Outputs are located on the right side of the back panel. The Outputs have a blue LED that will illuminate solid during active link (voltage + data link)
- **The RS-232, Serial IR, and Power connections** are located on the right side of the back panel.

Audio Outputs

- Each Output Channel has **1 Analog L/R Audio Output:** 3.5mm Stereo Phone Jack which provides de-embedded 2ch Analog Audio Output from selected HDMI input source
- Each Output Channel has **1 Digital Audio Output:** RCA Jack which provides de-embedded Digital Audio Output from selected HDMI input
- There are no volume or tone control features, only muting control of the external audio outputs via RS232.
- There are no DSP features. Ie, in order to achieve 2ch analog audio output, the selected HDMI input source audio format must be 2ch.

Audio Input Signal Format	Analog L/R Output	Digital Audio Output (Coax & Optical)
2CH PCM	Pass-through	Pass-through
Multi-Channel PCM	MUTE	MUTE
DOLBY/DTS	MUTE	Pass-through
HD Audio	MUTE	MUTE

Front Panel Operation



- There are 4/8 Output buttons along the front panel.
- Pressing an output button will select the next HDMI input.
- A blue LED will indicate which Input has been selected for each Output.
- Front button control can be disabled/enabled via RS232 if desired.
- The Optical IR window is located on the right side of the front panel receives IR remote control signals.
- Notes:
  - Front LEDs will scroll during boot up
  - Video OFF setting for an output is represented by a steady blinking of the selected input indicator LED for the respective output

Factory Default Reset via the Front Panel

To reset the unit to factory default settings, simultaneously press and hold the Output 1 and Output 4 (KD-4x4CSK) / Output 1 and Output 8 (KD-8x8CSK) buttons for approximately 10 seconds.

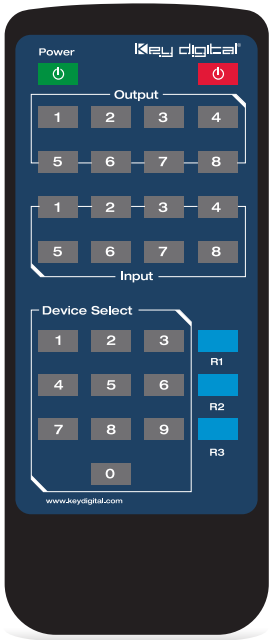
Default settings:

- All output to input selections are in bypass (Output 1 > Input 1, … Output 4 > Input 4, … Output 8 > Input 8)
- EDID to all inputs is Default EDID 4 (1080p with 2ch audio).
- All HDMI outputs are ON
- All external analog and digital audio outputs are enabled
- Unit address is 00

Remote Control

The KD-4x4CSK/KD-8x8CSK can be operated using the IR remote control provided with your unit. There are 3 main groups of controls, one group for output select buttons, one group for input select buttons, and one group for device select buttons. Additionally, there are discrete power on and off buttons and function buttons “R1”, “R2, and “R3”.

- The remote is powered by a CR2025 type battery
- The circular IR sensor accepts control signals from the remote control. The sensor is located to the right of the front panel.



Switching

To execute a switching command, first select the output you wish to switch (1), and then select the desired input (2).

EDID Control

The KD-4x4CSK/KD-8x8CSK have a built-in library of 15 EDID settings and the ability to copy EDID data from any output specified via IR and RS-232. EDID Control setup via RS-232 can be found in the RS-232 Commands and Protocol section.

Set to Default EDID

To change the EDID of the system via IR, press the following buttons on the Key Digital IR remote control: **R2 › R1 › R3 › A › XX**.

NOTES:

- A = Desired Input to copy EDID to, chosen on Input section of remote
- XX = Desired EDID selected from below chart, chosen on Device Select section of remote.

Copy EDID from Output

To Copy EDID from Output 'B' to Input 'A', press the following buttons on the remote control:
R2 › R1 › R3 › A › B

NOTES:

- A = Desired Input, chosen on Input section of remote
- B = Desired Output to copy EDID from, chosen on Output section of remote.

Default EDID Table:

01	1080i, 2CH AUDIO	**10**	4Kx2K@60, 2CH AUDIO
02	1080i, DOLBY/DTS 5.1	**11**	4Kx2K@60, DOLBY/DTS 5.1
03	1080i, HD AUDIO	**12**	4Kx2K@60, HD AUDIO
04	**1080p, 2CH AUDIO**	**13**	1280x720p@60 DVI
05	1080p, DOLBY/DTS 5.1	**14**	1920x1080p@60 DVI
06	1080p, HD AUDIO	**15**	3840x2160p@30 DVI
07	4Kx2K@30, 2CH AUDIO	**NOTE: Default EDID is 04 (1080p, 2ch audio)** *EDID (Extended display identification data) is a data structure provided by a display to describe its capabilities to a source device	
08	4Kx2K@30, DOLBY/DTS 5.1		
09	4Kx2K@30, HD AUDIO		

Addressing Mode

Units may be addressed when used in a cascaded configuration. To address your Champion Series switch, press the following buttons on the Key Digital IR remote control:
R3 › R1 › R2 › XX

NOTES:

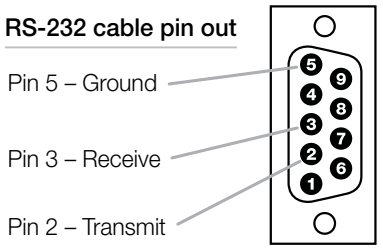
- XX = Desired address, chosen on Device Select section of remote.
- Default address is 00 – Single unit mode.
- Once a unit has been addressed, the two-digit unit address must precede all IR command sequences

RS-232 Commands and Protocol

The KD-4x4CSK/KD-8x8CSK provide access to all functions when used with an RS-232 control system or Computer.

- RS-232 Protocol:
  - Baud Rate = 57600 bits per second
  - Data Bits = 8
  - Stop Bits = 1
  - Parity = None
  - Flow Control = None
  - Carriage Return: Required
  - Line Feed: Required

RS-232 cable pin out



- Commands are not case-sensitive. Spaces shown below may be excluded.
- Carriage return and line feed is required at the end of each string.

Response from Help command (list and description of all available RS-232 commands):

```
KD-8x8CSK> H

------------------------------------------------------------------------------
--                      Key Digital Systems HELP                            --
------------------------------------------------------------------------------
-- KD-8x8CSK             System Address = 00        F/W Version : 2.02 --
--                                                                          --
-- Azz         : All Commands may have Prefix System Address zz=[01-99] --
-- H           : Help                                                       --
-- PF          : Power Off                                                  --
-- PN          : Power ON                                                   --
-- STA         : Show Global System Status                                  --
--                                                                          --
-- Video Output Setup Commands:                                             --
--    ( xx = [01-08,A], yy = [01-08,U/D], A=All, U=Up, D=Down )             --
-- SPO xx SI yy  : Set Output xx to Video Input yy                          --
-- SPO xx ON/OFF : Set Output xx ON/OFF                                     --
-- SPO xx DBG ON/OFF : Set Output xx Debug Mode ON/OFF                      --
-- SPO xx HFM A/D/H  : Set Output xx to Video Format by                     --
--                     Auto(A)/Forced DVI(D)/Bypass(H)                      --
--                                                                          --
-- EDID Setup, xx = [01-08,A], yy = [01-08], zz = [01-15] (A=All)           --
-- SPC EDID xx H yy : Copy EDID from Ouput yy to Input xx                   --
-- SPC EDID xx D zz : Copy EDID from Default EDID zz to Input xx            --
--    DEFAULT EDID 01 : HDMI Video 1080i@60, Audio 2CH PCM Audio            --
--    DEFAULT EDID 02 : HDMI Video 1080i@60, Audio PCM,DTS/DOLBY            --
--    DEFAULT EDID 03 : HDMI Video 1080i@60, Audio PCM,DTS/DOLBY/HD         --
--    DEFAULT EDID 04 : HDMI Video 1080p@60, Audio 2CH PCM Audio            --
--    DEFAULT EDID 05 : HDMI Video 1080p@60, Audio PCM,DTS/DOLBY            --
--    DEFAULT EDID 06 : HDMI Video 1080p@60, Audio PCM,DTS/DOLBY/HD         --
--    DEFAULT EDID 07 : HDMI Video 4Kx2K@30/3D, Audio 2CH PCM Audio         --
--    DEFAULT EDID 08 : HDMI Video 4Kx2K@30/3D, Audio PCM,DTS/DOLBY         --
--    DEFAULT EDID 09 : HDMI Video 4Kx2K@30/3D, Audio PCM,DTS/DOLBY/HD      --
--    DEFAULT EDID 10 : HDMI Video 4Kx2K@60/3D, Audio 2CH PCM Audio         --
--    DEFAULT EDID 11 : HDMI Video 4Kx2K@60/3D, Audio PCM,DTS/DOLBY         --
--    DEFAULT EDID 12 : HDMI Video 4Kx2K@60/3D, Audio PCM,DTS/DOLBY/HD      --
--    DEFAULT EDID 13 : DVI Video Max. 1280x720@60, No Audio                --
--    DEFAULT EDID 14 : DVI Video Max. 1920x1080@60, No Audio               --
--    DEFAULT EDID 15 : DVI Video Max. 3840x2160@60, No Audio               --
--                                                                          --
```

```
--                                                                          --
-- Audio Output Setup Commands: xx = [01-08,A], [E=Enable, D=Disable]       --
-- SPO xx AA E/D : Enable/Disable External Analog Audio Output              --
-- SPO xx DA E/D : Enable/Disable External Digital Audio Output             --
--                                                                          --
-- System Address Setup Command: xx = [00-99], 00 = Single                  --
-- SPC Axx     : Set System Address to xx                                   --
--                                                                          --
-- System Control Setup Commands:                                           --
-- SPC RSB z   : Set RS232 Baud Rate to z bps, z=[0-4]                      --
--               [0:57600, 1:38400, 2:19200, 3:9600, 4:4800]                --
-- SPC FB E/D : Enable/Disable Front Panel Buttons                          --
-- SPC DF      : Reset to Factory Defaults with DEFAULT EDID 04             --
----------------------------------------------------------------------------
```

Response from Status command (current settings and/or status of unit):

```
KD-8x8CSK> STA

----------------------------------------------------------------------------
--                    Key Digital Systems STATUS                          --
----------------------------------------------------------------------------
-- KD-8x8CSK            System Address = 00        F/W Version : 2.02 --
--                                                                        --
-- Power : ON                                                             --
-- RS232 : Baud Rate=57600bps, Data=8bit, Parity=None, Stop=1bit          --
-- Front Panel Button : Enabled                                           --
--                                                                        --
-- Video Input 01   : EDID = DEFAULT 04,  LINK = ON                       --
-- Video Input 02   : EDID = DEFAULT 04,  LINK = ON                       --
-- Video Input 03   : EDID = DEFAULT 04,  LINK = ON                       --
-- Video Input 04   : EDID = DEFAULT 04,  LINK = ON                       --
-- Video Input 05   : EDID = DEFAULT 04,  LINK = OFF                      --
-- Video Input 06   : EDID = DEFAULT 04,  LINK = OFF                      --
-- Video Input 07   : EDID = DEFAULT 04,  LINK = OFF                      --
-- Video Input 08   : EDID = DEFAULT 04,  LINK = OFF                      --
--                                                                        --
-- Video Output 01 : IN = 01, OUT = ON , LINK = ON , DBG = OFF, AUTO      --
-- Video Output 02 : IN = 02, OUT = ON , LINK = ON , DBG = OFF, AUTO      --
-- Video Output 03 : IN = 03, OUT = ON , LINK = ON , DBG = OFF, AUTO      --
-- Video Output 04 : IN = 04, OUT = ON , LINK = ON , DBG = OFF, AUTO      --
-- Video Output 05 : IN = 05, OUT = ON , LINK = OFF, DBG = OFF, AUTO      --
-- Video Output 06 : IN = 06, OUT = ON , LINK = OFF, DBG = OFF, AUTO      --
-- Video Output 07 : IN = 07, OUT = ON , LINK = OFF, DBG = OFF, AUTO      --
-- Video Output 08 : IN = 01, OUT = ON , LINK = OFF, DBG = OFF, AUTO      --
--                                                                        --
-- Audio Output 01 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 02 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 03 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 04 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 05 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 06 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 07 : Analog = Enabled, Digital = Enabled                  --
-- Audio Output 08 : Analog = Enabled, Digital = Enabled                  --
----------------------------------------------------------------------------
```


Specifications

Technical:

- Input (Each): 1 HDMI Connector, Type A, 19 Pin Female
- Output (Each): 1 HDMI Connector, Type A, 19 Pin Female;
  3.5 mm stereo jack connector for Analog L/R Output;
  RCA Jack for Digital Audio Output [follows SPDIF format (IEC 60958)]
- Bandwidth: TMDS bandwidth 10.2 Gb/s
- Deep Color Support: Supports digital video formats in Deep Color Mode up to 12 bits/color with all HDMI and HDCP technologies
- Link: Single Link
- DDC Signal (Data): Input DDC Signal - 5 Volts p-p (TTL)
- HDMI Video/Audio Signal: Input Video Signal - 1.2 Volts p-p
- DDC Communication: EDID and HDCP buffering between source and display
- Wired IR: modulated IR signal input, 0-5V TTL or -10to +10V, 3.5mm mono female connector with signal on tip
- Power: External Power Supply – (KD-4x4CSK) 12V/2A, (KD-8x8CSK) 12V/5A

General:

- Regulation: CE, RoHS, WEEE
- Enclosure: Black Metal
- Rack Mount: 1U, Full Rack Width (rack ears included)
- Product: 17.25” x 7.5” x 1.75” , Weight: 5.2 lbs
- Packaging: 21.25” x 13” x 3.5”, Weight: 7.9 lbs

Important Product Warnings:

1. Connect all cables before providing power to the unit.
2. Test for proper operation before securing unit behind walls or in hard to access spaces.
3. If installing the unit into wall or mounting bracket into sheet-rock, provide proper screw support with bolts or sheet-rock anchors.

Safety Instructions:

Please be sure to follow these instructions for safe operation of your unit.

1. Read and follow all instructions.
2. Heed all warnings.
3. Do not use this device near water.
4. Clean only with dry cloth.
5. Install in accordance with the manufacturer's instructions.
6. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
7. Only use attachments/accessories specified by the manufacturer.
8. Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way including:
   - Damage to the power supply or power plug
   - Exposure to rain or moisture

Power Supply Use:

You MUST use the Power Supply provided with your unit or you VOID the Key Digital® Warranty and risk damage to your unit and associated equipment.

How to Contact Key Digital®

Technical Support

For technical questions about using Key Digital® products, please contact us at:

- Phone: 914-667-9700
- E-mail: tech@keydigital.com

Repairs and Warranty Service

Should your product require warranty service or repair, please obtain a Key Digital® Return Material Authorization (RMA) number by contacting us at:

- Phone: 914-667-9700
- E-mail: rma@keydigital.com

Feedback

Please email any comments/questions about the manual to:

- E-mail: customersupport@keydigital.com

Warranty Information

All Key Digital® products are built to high manufacturing standards and should provide years of trouble-free operation. They are backed by a Key Digital Limited Lifetime Product Warranty Policy.

http://www.keydigital.com/warranty.htm